A Successful Random ARISS Contact with $120 Station Setup

Daniel Ernandes, KK4HBI

Background

- Not many people know one can contact the ISS unscheduled
- Fewer think it is possible to do it without an expensive station
- With only a modest station, proper timing, and luck, it is possible

Station setup

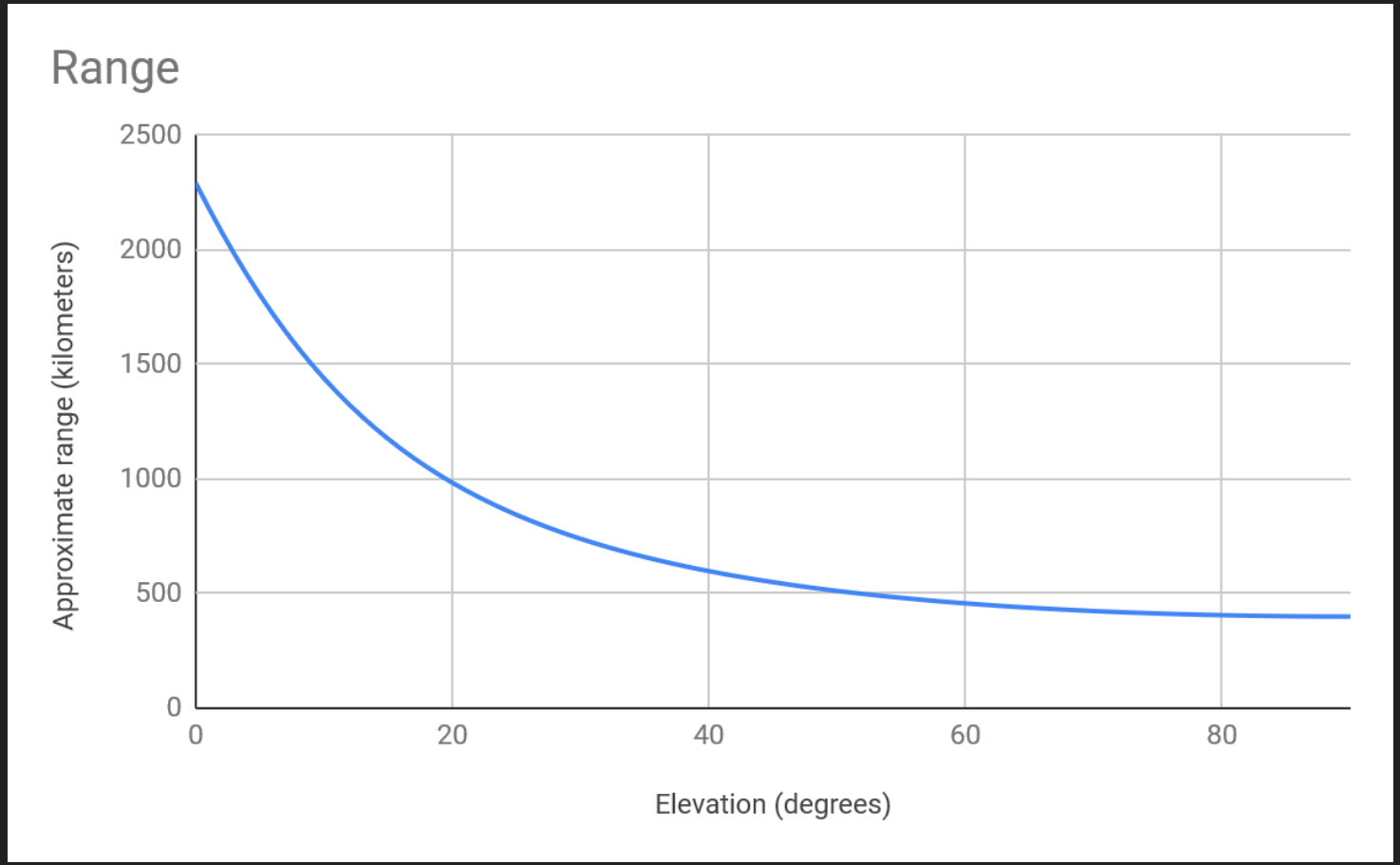
- Very basic station
- Only components are transceiver and antenna
- Antenna is a half-wave 2-meter J-Pole
- 5 watt ICOM IC-V80 handheld transceiver using 4 AA batteries
- Transceiver costs approximately $100

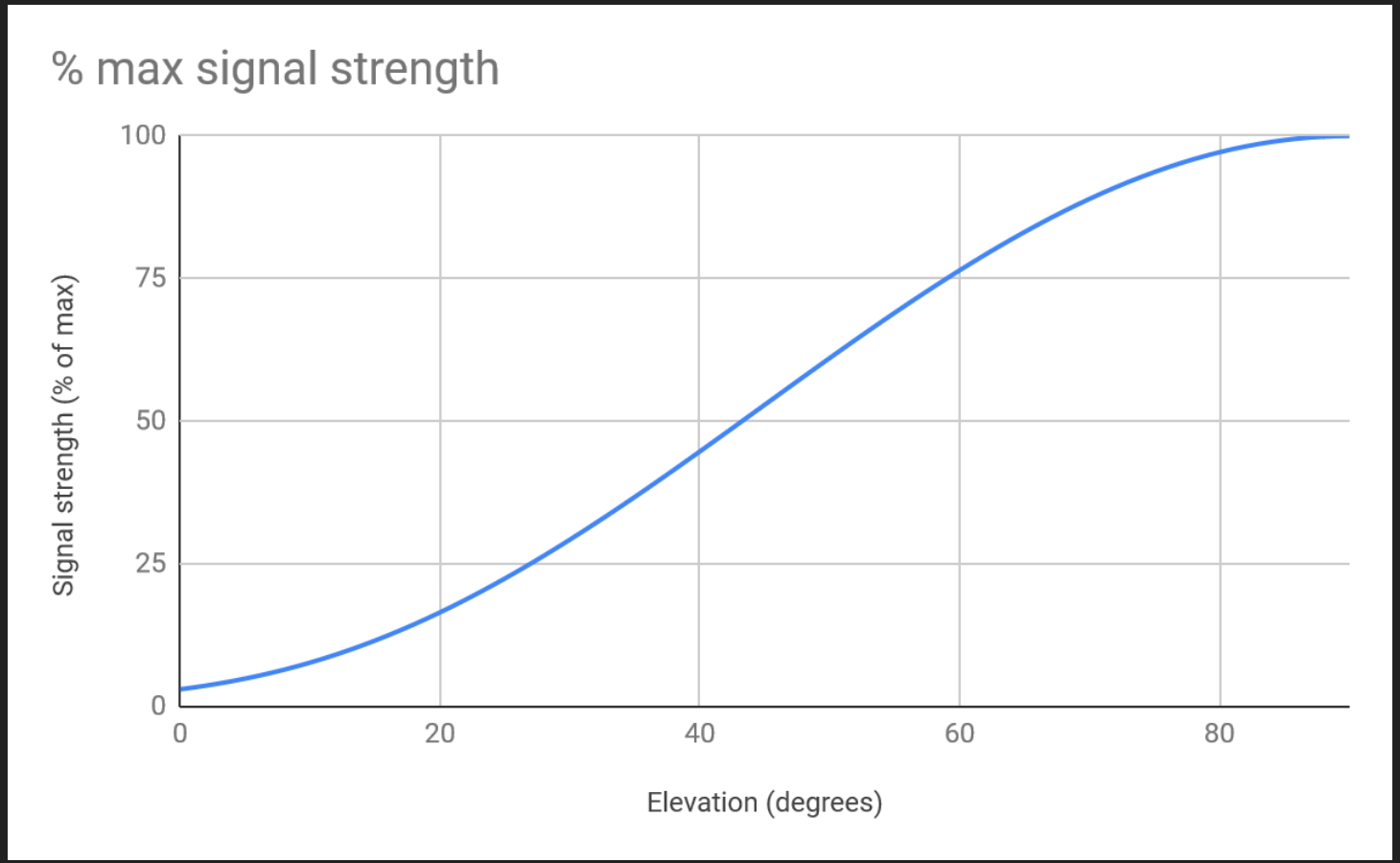
Contact setup

- Many attempts over many weeks
- Used smartphone app to track satellites
- During contact was able to track the station by eye if in sun
- Manually aimed director of antenna
- Attempted only in afternoon and evening due to my schedule
- Best time is approximately 0700 UTC

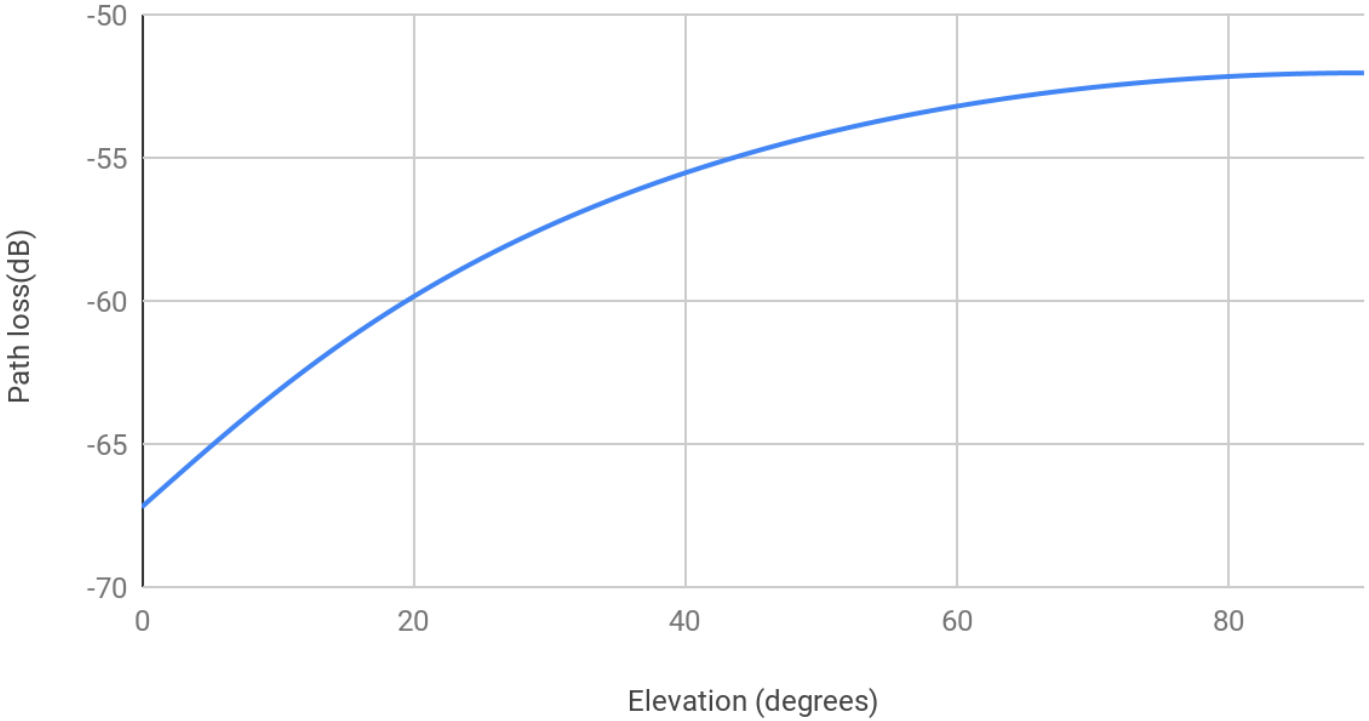
Contact

- Contact began at approximately 1930 Eastern Standard Time
- Signal extremely weak at start due to doppler, range, and low power
- As range began to close the contact became full quieting
- Station passed directly overhead so the contact was fairly long


Range
2500
2000
1500
1000
500
0
Approximate range (kilometers)
0
20
40
60
80
Elevation (degrees)


% max signal strength
Signal strength (% of max)
100
75
50
25
0
0
20
40
60
80
Elevation (degrees)

Path loss



Lessons Learned

- Contacting the ISS will most likely be difficult
- An expensive station may not improve likelihood of contact
- Proper planning will make a contact significantly more likely
- Even a simple station can contact the ISS
- Most of the challenge is in an astronaut being available to respond